

33. (New) The method of claim 27 wherein the selected process gas comprises a mixture of tetraethylorthosilicate and a fluorine-containing halocarbon gas selected from the group consisting of CY₄ and CX₃-(CX₂)_n-CX₃, wherein X is hydrogen or halogen and n is an integer from 0 to 5 with the proviso that at least one X is fluorine, and wherein Y is hydrogen or halogen and at least one Y is hydrogen and at least one Y is fluorine.

34. (New) The method of claim 33 wherein the layer of silicon oxide contains at least about 2.5 atomic percent of fluorine over the conductive lines.

REMARKS

Claims 1-10 and 27-34 are pending. Claims 11-26 have been canceled. Claims 1 and 8 have been amended. New claims 27-34 have been added. No new matter has been introduced.

Claims 1-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nishiyama et al. Applicants respectfully submit that claims 1-10 are patentable over Nishiyama et al. because, for instance, Nishiyama et al. does not teach or suggest forming a layer using a gas comprising tetraethylorthosilicate and a gas selected from the group consisting of CY₄ and CX₃-(CX₂)_n-CX₃, wherein X is hydrogen or halogen and n is an integer from 0 to 5 with the proviso that at least one X is fluorine, and wherein Y is hydrogen or halogen and at least one Y is hydrogen and at least one Y is fluorine, as recited in independent claims 1 and 8. Some examples of suitable gases are listed in the specification at page 7, lines 22-25.

Claims 1-10 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 29-33, 38-40, and 42-45 of copending Application No. 08/888,499. Applicants intend to file a terminal disclaimer in response to this rejection.

Applicants believe claims 27-34 are patentable. Independent claim 27 recites a method of forming a layer of silicon oxide over a substrate having spaced conductive lines thereon in a process chamber. The method comprises introducing a selected process gas comprising silicon and oxygen into the process chamber. A flow of a halogen source is added to the selected process gas at a flow rate previously determined to achieve a desired stress in the layer from a plasma enhanced reaction of the selected process gas and the flow of the

halogen source at the flow rate. The desired stress in the layer is a tensile stress instead of a compressive stress in a layer formed from a plasma enhanced reaction of the selected process gas without the flow of the halogen source. A layer is formed from a plasma enhanced reaction of the selected process gas and the flow of the halogen source at the flow rate.

Generating a tensile stress instead of a compressive stress in a layer by adding a flow of a halogen source is illustrated, for instance, in Fig. 13. In Fig. 13, the halogen source is C₂F₆. The stress in the layer is a compressive stress of about -1.25×10^9 dyne/cm² at zero C₂F₆ flow rate. The magnitude of the compressive stress decreases with an increase in the C₂F₆ flow rate. At a C₂F₆ flow rate of about 600 sccm, the stress becomes a tensile stress of about 0.4×10^9 dyne/cm².

generic stress
out less than
is claim 27

Nothing in the cited art discloses or suggests adding a flow of a halogen source to a selected process gas comprising silicon and oxygen to achieve a tensile stress, instead of a compressive stress in a layer formed using the selected process gas without the flow of the halogen source. At least for the foregoing reasons, Applicants respectfully assert that claims 27-34 are patentable.

Applicants note that the addition of claims 27-34 does not violate the recapture rule. MPEP 1412.02 states: "Impermissible recapture occurs in a reissue where the claims in the reissue are of the same scope as, or are broader in scope than, claims deliberately canceled in an application to obtain a patent. Where such claims also include some narrowing limitation not present in the claims deliberately canceled in the application, the examiner must determine whether that narrowing limitation has a material aspect to it. If the narrowing limitation has a material aspect to it, then there is no recapture." In this case, Applicants respectfully assert that independent claim 27 includes a narrowing limitation not present in the claims deliberately canceled in the application and that the narrowing limitation has a material aspect to it. Thus, there is no recapture in claims 27-34.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

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If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Chun-Pok Leung".

Chun-Pok Leung
Reg. No. 41,405

TOWNSEND and TOWNSEND and CREW LLP
Tel: (650) 326-2400
Fax: (650) 326-2422
RL
SF 1031156 v2